

TROPICAL EAR

BY

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PLATE IV

This condition is known in the Malay states as 'Singapore Ear,' but it is prevalent in all tropical or semi-tropical climates. In Calcutta it is called 'Calcutta Ear,' in Java 'Java Ear,' in Hongkong 'Hongkong Ear,' but the comprehensive term 'Tropical Ear' is, perhaps, more suitable.

So far as I can find out no definite attempt has been made to investigate the nature of this condition, notwithstanding the fact that it is very common among all classes, European as well as native.

During the past twelve months I have examined and made cultures from over a hundred cases.

'Tropical Ear' may be defined as:—A localised infection of the external auditory meatus which does not involve the middle ear, but sometimes, though rarely extends into it.

From the etiological findings it is possible to divide it into two main groups, viz. :—

- I. Otomycotic.
- II. Bacterial.

Group I. OTOMYCOTIC

Isolated cases of fungus in the ear have been found by many investigators. Thus Castellani and Chalmers give the following :—

Mucor pucillus, Lindt, 1886; *Lichtheimia corymbifera*, Cohn, 1884; *Lichtheimea ramosa*, Lindt, 1886; *Saccharomyces ellipsoides*, Rhees, 1870; *Monilia rhoi*, Castellani, 1909; *Aspergillus flavus*, De Bary, 1840; *Aspergillus flavus*, De Bary, 1870; *Aspergillus malignus*, Lindt, 1889; *Aspergillus repens*, De Bary, 1870.

In the fifteen cases met with, fourteen were found to be due to an *Aspergillus*, and one was found to be a yeast. As the yeast infection differs so much from the others and is an isolated case,

it has been described under ' Accidental Infections ' in the bacterial group, though it belongs to the *Saccharomyces*.

Among the fourteen cases of *Aspergillus* Infection, four distinct colour varieties were found :—

- (1) Black. (5).
- (2) Reddish brown. (1.)
- (3) Mouse-coloured. (1.)
- (4) Green in three shades ; Blue-green, Olive-green, Grass-green. (7.)

Aspergillus niger is larger than the other species, is more virulent, and grows more quickly.

Green aspergillus differs from *A. niger* in the following points :—

Colour : (a) Blue-green ; (b) Olive-green ; (c) Grass-green. It has a more delicate structure. It has finer sterigmata. It is smaller. The diameter of the spores is from 3-4 microns. The growth soon withers and the colour fades, though the spores remain alive for long periods.

The different varieties, Blue-, Olive-, and Grass-green breed true.

Brown aspergillus culture has a reddish brown colour and spores 3 microns in diameter. Only one case seen. Breeds true on sub-culture. Otherwise has the characters of an *Aspergillus*.

Mouse-coloured aspergillus, except for the colour, does not differ from the brown variety. Breeds true on sub-culture.

CLINICAL MANIFESTATIONS. The symptoms were the same in all fourteen cases, though the duration and severity varied slightly.

In the early stage itching and irritation of the meatus are the only signs ; later, deafness and a feeling of ' fulness ' in the ear become more and more marked ; later still the irritation increases to actual pain. On examination of the meatus the picture is fairly characteristic. If wax is present, the only indication is the presence of white caseous looking material, mixed with the normal brown wax. If wax is absent, the white furry growth can be clearly seen on the walls of the meatus, and sometimes on the drum itself. Later the canal becomes completely choked with this white caseous material and the brown wax disappears, showing that the fungus grows on the wax and absorbs it. If left undisturbed, this white caseous material becomes crinkled and crenated and looks very

like a mass of sodden desquamated epithelium, for which it is often mistaken.

Clinically, except for slight redness of the walls of the meatus and occasionally slight opacity of the drum, no evidence of disease can be detected, once the meatus has been thoroughly syringed and swabbed out. There is no tenderness of the auricle or auricular glands; no fever or malaise; and the slight amount of deafness is due to the mechanical blocking of the ear.

TREATMENT. As many cases do not come for treatment until the condition is far advanced, some difficulty may be met in clearing the meatus, which is choked with a thick growth of fungus. It may be necessary to pick it out piece-meal with forceps. But in the majority of cases, softening with pure hydrogen peroxide and syringing with hot water and peroxide will dislodge the main bulk of the growth. The meatus and drum can then be swabbed clean of the remaining portions, which sometimes cling tenaciously, especially in the anterior recess between the drum and meatal wall; a strong antiseptic should be used in doing this, such as S.V.R. (rectified spirit of wine).

To all appearances the meatus is free from growth and the patient cured; but a recurrence is likely unless a more systematic treatment is adopted.

The following routine is suggested :—

First day—

(1) Instil pure peroxide into meatus and allow to act for two minutes.

(2) Syringe with hot water and peroxide until bulk of growth is dislodged.

(3) Swab out with dry wool, paying particular attention to the anterior recess and the surface of the drum.

(4) Swab out with hydrarg. perchlor. 1 gr. to the oz. of S.V.R.

(5) Pack meatus with wool soaked in a solution of perchloride in spirit $\frac{1}{4}$ gr. to the oz.

Second and Third days.

Repeat above.

Fourth day.

Clean as before, instil drops of perchloride in spirit (1 gr. to the oz.) and pack with dry wool.

The patient should carry on the daily treatment himself for one week as follows :—

- (1) Instil pure peroxide and allow to act for two minutes.
- (2) Dry thoroughly and instil two drops of perchloride in spirit ($\frac{1}{2}$ gr. to the oz.).
- (3) Pack with dry wool.

Weekly Inspection should be made for a month and treatment repeated as on the first day. As well as this, the patient should on two days in each week, instil drops of carbolic in glycerine (1 in 5). In persistent cases it is advisable to vary the antiseptic and the following have been found effective :—

(1) Proflavine in saline 1-1000, or 1-500. The ear can be packed with wool soaked in this. The only objection to its use is that it gives rise to great itching, for some days after.

(2) *Linimentum belladonnae* and *Linimentum opii* equal parts. This can be painted over the walls of the meatus ; or a pledget of wool soaked in it can be packed into the ear. The burning pain to which it gives rise, passes away in about half-an-hour.

(3) Zinc sulphate gr. 10, cocaine hyd. gr. 2, boric acid gr. 10, S.V.R. $\frac{1}{2}$ oz., aqua ad. 1 oz. This can be used as ear drops twice daily, three days in each week for a month.

Prophylactic Treatment.

- (1) Keep the ears as dry as possible.
- (2) Cleanse the ear daily with 3 per cent. mercurial soap.
- (3) Pack the ears when bathing with wool and sterile vaseline.

The following illustrative cases are of interest :—

CASE 1. A. J. 1st September, 1920. Complains of fulness and discomfort in the ear. Meatus completely blocked with thick white plug. Removed with forceps and syringing, when large perforation is seen in anterior sup. quadrant.

21st September. Meatus almost choked again. Black mould growing on walls, flowers and stalks clearly visible. Perforation unchanged. Complains of discomfort but no pain.

25th September. Mould still present. Flowers clearly seen. No symptoms.

29th September. Mould still present.

30th September. No mould visible. Perforation unchanged.

1st October. No mould present.

3rd October. Mould again visible.

5th October. No mould. Perforation smaller.

7th October. No mould. No symptoms. Perforation smaller but permanent.

The *treatment* adopted was that given above.

CASE 2. A. H. 13th October, 1920. Both ears blocked with white macerated material. Complains of great discomfort and deafness.

25th October. Ears clear.

28th October. Fungus again present. No symptoms.

22nd November. No symptoms, but small amount of white fur in depths of meatus from which *Aspergillus niger* grew.

7th March, 1921. Small amount of fungus in both ears. Complained of slight irritation for two days previously.

The above case was one of a traveller who could only come for a day or two for treatment, with long intervals in between.

The treatment was on the lines already indicated.

CASE 3. E. S. M. 18th April, 1921. Deafness and great pain in ear of one day's duration; history of discomfort and increasing deafness for past ten days. Meatus completely blocked with white caseous material. This was so tough that it had to be picked out with forceps before the meatus could be syringed out. Portions of desquamated epithelium came with it, leaving a raw red surface on the walls and an acutely inflamed drum. A minute perforation of the drum present. (Culture made).

Carbolic and glycerine (1-5) drops packed in, as inflammation too severe to apply spirit.

19th April. Meatus clear. Drum greatly inflamed, with white patch of fungus on it surrounding the perforation which is distinctly larger. (Culture shows *A. niger*).

White patch on drum carefully removed and whole ear swabbed out with perchloride in spirit. The perforation healed rapidly.

Group II. BACTERIAL

From the etiological findings it is possible to divide this group into three sub-divisions:—

- (1) Simple.
- (2) Accidental.
- (3) True Tropical Ear.

SIMPLE INFECTIONS

SYMPTOMS.

Irritation in the ear, feeling of fulness, slight deafness. As a rule the meatus is blocked with wax; or there may be a slight mucopurulent discharge, together with a sodden appearance of the walls of the meatus.

ETIOLOGY.

The culture media show the presence of a mixed infection, comprising *Staphylococcus albus*, and *S. aureus*, *Micrococcus catarrhalis*, large diplococci, *Bacillus coli*, occasionally a few streptococci. In one case *S. aureus* in pure culture was found.

TREATMENT.

This condition readily clears up under treatment. Peroxide drops, followed by syringing with warm antiseptic lotion, drying thoroughly, and finally drops of perchloride in spirit, the ear being packed with dry wool; one thorough cleaning as above is often sufficient. The patient should, nevertheless, use glycerine and carbohc drops, for three days.

ACCIDENTAL INFECTIONS

In this group are included those rare infections that could not be grouped elsewhere. The following case was due to a *Saccharomyces* infection.

CASE 1. B. 26th October, 1920. Complaining of pain and discharge from the ear and slight deafness. Meatal walls covered with this mucopurulent material. Meatus inflamed; small yellow vesicles seen on walls and drum. Drum very much inflamed with a yellow patchy appearance. No bulging of drum and no appearance of middle ear infection. No history of sore throat. (Culture made).

27th October. Great pain during the night, which passed away gradually, meatus full of glairy muco-pus, pale yellow in colour. Large perforation of drum in anterior quadrant.

30th October. Much cleaner. Drum less inflamed but still shows the peculiar yellow patchy appearance. Perforation slightly smaller. Culture shows a pure growth of a yeast.

1st November. No pus; greatly improved. Yellow patches on drum still present.

3rd November. Improved. Perforation unchanged.

18th November. No pus or inflammation. Ear dry. Perforation much larger, has extended on each side into the yellow patches.

2nd December. Perforation smaller.

18th March. Perforation much smaller, but apparently permanent.

Treatment. The double liniment was used daily for the first week. After that, perchloride in spirit.

Case of mixed *B. diphtheriae* and *B. coli* infection.

CASE 2. E. 18th July, 1921. Complains of pain in the right ear and slight deafness. Meatus full of yellow pus slightly glairy in consistence, walls slightly inflamed, drum inflamed but intact, no evidence of middle ear infection. Anterior recess filled with fungus-like material.

27th July. Discharge copious; thin, glairy, pale yellow in colour. Meatus painful and swollen. The symptoms had been quiescent and only reappeared the previous day. (Culture made).

29th July. Discharge copious of a thin, glairy, colourless appearance. Pain gone, swelling less. (Culture shows presence of *B. coli* and a *Diphtheroid bacillus*). (Sub-culture made).

30th July. Discharge very copious. Pain gone; swelling less. (Sub-culture shows *B. diphtheriae*).

(Second sub-culture made). The second sub-culture showed pure growth of *Diphtheria bacillus*.

31st July. Copious, translucent, glairy fluid. Slight swelling but no pain.

1st August. Unchanged.

2nd August. Complained of feeling drowsy the previous day. Discharge less, swelling of walls of meatus almost gone. White membrane seen on drum and adjacent wall, filling anterior recess. (Previously obscured by swelling of walls). Membrane very adherent.

3rd August. Discharge less. Some of membrane removed by careful swabbing, but too broken up for examination. Improvement continued and on 6th August no sign of inflammation was left except a white mark on drum.

28th August. Recurrence of all symptoms which cleared up after a week's treatment, and did not again return.

Treatment. First day. Cleaned and packed with carbolised glycerine. Drops of glycerine and carbolic given for daily use. When the *Diphtheria Bacillus* was found, the ear was packed daily with perchloride in spirit (1 gr. to the oz.) and 4,000 units of antitoxin were given subcutaneously into the abdominal wall. This treatment made no impression on the quantity of the discharge, but the nature of the discharge changed slightly; the yellow tinge disappeared. The walls of the meatus and the drum were then painted with Proflavine 1 in 100 saline. This also had no effect.

1st August. Pure peroxide two minutes, syringing with warm water and peroxide; drying thoroughly; painting the whole interior with antitoxin and packing ear with wool soaked in antitoxin. Improvement was noticed at once. This was repeated for six days, by which time all signs of infection had completely disappeared. The patient was told to continue with the glycerine and carbolic drops for a day or two. Three weeks later the whole condition reappeared, but completely cleared up after a further course of treatment with antitoxin.

This was an interesting case as it showed a double infection with *B. coli* and *B. diphtheriae*. The *B. coli* disappeared under ordinary antiseptic treatment, while strong antiseptics such as perchloride in spirit (1 gr. to the oz.), pure peroxide, and proflavine 1 in 100, had no effect on the diphtheria bacillus. Antitoxin acted at once and with great effect when applied locally. As no perforation was present the infection did not come from the throat or nasopharynx; and repeated swabs from both these localities showed the absence of *B. diphtheriae*, proving that the infection was a primary infection of the external auditory meatus.

TRUE TROPICAL EAR

The third type of bacterial infection is distinguished, firstly, by a constant group of clinical symptoms and, secondly, by its etiology.

SYMPTOMS. Onset always acute. Malaise marked, fever between

99°-100°. Pain acute; unilateral, though other ear may become infected later.

The pain is centred in the external auditory meatus, but diffuses widely over the same side of the head and may give rise to a severe, throbbing headache. May be agonising in character, excluding all possibility of sleep. Together with the throbbing ache, sharp shooting pains are an alarming feature. Moving the jaw greatly aggravates the pain.

Tenderness a very marked feature, and usually involves the whole of the pinna, the anterior and the inferior auricular glands and sometimes the superior cervical glands. It is centred in the meatus where even the slightest touch is unbearable. No tenderness over mastoid (provided the pinna is not touched). The anterior and inferior auricular glands, and sometimes cervical glands are also involved. Pinna swollen. Walls of external auditory meatus swollen throughout its entire length, and as a rule the canal is obliterated by apposition of the walls. The walls are so swollen that it is often impossible to insert even a fine probe between them. But as acute pain is practically the first symptom, the patient usually comes for treatment before the swelling has obliterated the canal. No swelling over mastoid region.

Presence of small vesicles. Greenish-yellow in appearance on the walls of the meatus, which are thin walled and filled with yellow pus with a faint green tinge in it. When the vesicle is removed, a raw red surface is left. In the later stages it is possible to trace a minute sinus running down from each vesicle towards the cartilage of the pinna, from which pus can be seen exuding. The swelling is at first local, but it rapidly gives rise to intense inflammation, which causes swelling of the whole extent of the canal.

The Drum remains unaffected except for slight inflammation. In no case has perforation resulted.

Course. The condition runs the following course:—Infection of ear; formation of vesicles on walls of meatus; pain and tenderness and swelling commence. Infection quickly spreads into deeper zones; inflammation of the cartilage, which gives rise to intense pain; the swelling of walls of canal, which becomes acutely tender; tenderness of pinna and swelling of glands follow. The next stage is the formation of a deep-seated abscess, which does not 'come

to a head' and burst, but burrows out a minute channel, which discharges the pus in minute quantities at irregular intervals, always leaving infection behind. Each time pus is evacuated the symptoms moderate and sometimes disappear altogether; but in a few days, often at the end of a week even, they reappear and the whole condition flares up again. A chronic abscess and the sinus is formed eventually and this may go on to necrosis of the cartilage lining the meatus or forming the pinna, with sometimes sloughing of considerable areas of tissue.

The condition may continue for several months. This is due to the fact that the infection remains deep seated and even spreads along the deeper planes before coming to the surface; when it does come to the surface it often reinfects another spot on the meatal wall. At no time, throughout the course of the disease, does pus appear in large quantities, as in middle ear infection.

It soon became evident that it was only when *B. pyocyaneus* was present, that symptoms of an intense character followed. And later it was found that in the majority of cases, the cultures showed almost pure growths of *B. pyocyaneus*, and in many cases, no other organisms were found even after prolonged search. The mixed infections usually included mild non-virulent organisms, such as *Micrococcus catarrhalis*, *Bacillus coli*, or large gram-positive diplococci. It was rare to find staphylococci or streptococci, thus differentiating the condition from middle ear infections and furuncle.

In the mixed infections, *B. pyocyaneus* outlived the other organisms, which were soon killed off by the antiseptic treatment. In the chronic cases where the pus came from a deep seated abscess, *Bacillus pyocyaneus* grew on media in almost pure culture. As the meatus is open to the outside air, it is not possible to make a culture which is uncontaminated, and, therefore, the results are all the more striking. In the hundred odd cases referred to, however mild the symptoms were, cultures were made. In many of these the medium remained sterile and no growth resulted, in the majority only slight growth of mild organisms appeared, showing that normally the walls of the meatus are more or less sterile. When, therefore, we find a virulent organism present, and associated with it, a constant set of symptoms not present in other infections, when we again and that in a large proportion of these cases, the infection with

B. pyocyaneus is a pure one, we must come to the conclusion that the germ is the cause of the disease; in other words, that *Bacillus pyocyaneus* is the cause of 'Tropical Ear.'

TREATMENT

Mild Cases include those which come early for treatment, some of which may in spite of treatment pass on into the severe stage.

If the meatus is choked with wax, it is necessary to syringe with warm water and peroxide; but unless it is absolutely necessary to clear the ear, do not syringe. This is an important point, because any moisture in the ear tends to make the walls of the meatus sodden, and a nidus is formed of softened dead epithelium, in which the germs propagate and through which they rapidly penetrate. After the ear has been cleansed and dried thoroughly, examine the walls of the meatus for vesicles; any found should be removed with forceps, and the pus absorbed on dry wool. Then instil a few drops of pure peroxide and allow to act for a few minutes, dry again carefully, and then swab the whole canal with perchloride in spirit. Finally, pack the ear with wool soaked in proflavine in saline 1-1000. A smart saline purge should be given and powders containing aspirin gr. 4, phenacetin gr. 4, caffeine citras gr. 2, taken thrice daily.

The best way to reduce the swelling and pain is to apply a pad of hot antiphlogistine, about half-an-inch thick, all round the ear and over the pinna, and keep it on all night.

Repeat the above treatment on the second day, but pack the ear with perchloride in spirit. If vesicles are present on the third day, swab out the whole canal with *Linimentum belladonnæ* and *Linimentum opii*, equal parts. In ordinary mild cases the above treatment will clear up the condition, provided the patient uses peroxide drops followed by perchloride in spirit daily for another week, when the meatus should again be inspected and thoroughly cleansed, and then packed with wool coated with a mixture of *Ung. hydrarg. ammoniatum* and *Ung. acidi borici* in equal parts. If the condition does not clear up in a week, or recurs, it passes into the severe and then into the chronic stage.

Severe Cases always imply the formation of deep-seated abscesses. If the infection can be checked at once, as above, abscesses will not form, but once the germ penetrates into the deeper layers the above treatment will not avail.

If the canal is not completely obliterated by swelling, pack the whole canal with wool soaked in equal parts of *Ung. belladonnae* and *Ung. opii*. This is painful at the time, but the pain passes away in about half-an-hour. Apply a pad of very hot antiphlogistine about half-an-inch thick all over the ear and down into the entrance of the meatus. This should be renewed at the end of six hours, and in the interval heat should be kept applied by means of a hot-water bottle on the pillow. Give a calomel purge. Do not syringe the ear as the point of the syringe in the meatus causes great pain and the syringing serves no useful purpose, the infection being deep down in the tissues. Do not use peroxide for the same reason, and also because some of it will get caught behind the swelling, and with the formation of gas, will give rise to pressure and pain. The object of the treatment is to draw the infection to the surface where it can be dealt with, for it shows no tendency to come there itself. The whole difficulty in the treatment is to get at the infection and thoroughly eradicate it, the tendency for it to lie dormant for long periods (7 days in one case) being an added obstacle.

OPERATIVE INTERFERENCE is found not only to be useless but dangerous as well, for the following reasons:—

(1) It is difficult to locate the position of the abscess in the deeper tissues, because the swelling involves the whole wall of the canal. When the abscess discharges pus it does so through a winding narrow sinus.

(2) If the knife does not strike the abscess, it opens up fresh tissues to infection.

Repeat the treatment given above on the second day. After the second day, the *pure carbolic treatment* should be employed at once, or if the meatus is completely obliterated on the first day, start with this method right away.

Pure Carbolic Treatment. A fine probe covered at the end with a very thin layer of cotton wool is dipped into pure carbolic acid and is used to touch the sides of all vesicles after they have been removed and the pus dried off. If a sinus is found, the exit should be cauterised and the probe passed down it as far as possible without causing bleeding. If, again, no vesicle can be located and at the same time the swelling of the walls of the meatus indicate the presence of a deep-seated abscess, the pure carbolic should be painted over

the most prominent part of the swelling on each wall. Care should be taken to avoid letting the acid overrun its allotted boundaries; this might produce severe burning or might injure the drum. But apart from this, large areas of meatal wall can be safely painted without fear of permanent damage. As much of the ear as possible should be dried carefully, for if the ear is moist the acid will diffuse over the ear and form a strong solution, which will injure the drum. After drying thoroughly, clean part with S.V.R. and allow it to evaporate. Then apply the pure carbolic with the tip of the probe moistened only, and paint the part two or three times till the surface turns white. Then pack the ear with dry wool. This is repeated the second day. On the third day it will be seen that the acid has killed the superficial epithelium, which can be readily removed, and the carbolic can then be applied to the exposed surface.

Gentle pressure should be applied to the swelling, but if pus does not readily appear, the pressure should not be continued, as it will force the pus along the lower planes and thus infect new tissue. If pus comes to the surface, it should be carefully wiped off, and care taken that it does not touch other parts of the meatal wall. Under this treatment the symptoms will rapidly disappear. The swelling goes down quickly, allowing of free access to the deeper portion of the meatus, which should be carefully cleaned each time; the pus will either come to the surface and discharge, or it will be absorbed. After the four applications, it is not as a rule necessary to continue with the carbolic. Treatment should, nevertheless, be continued for another week. The meatus should be cleansed with perchloride and spirit and the ear then packed with wool coated with *Ung. hydrarg. ammon.* and *Ung. acidi boric*, equal parts. Careful inspection should be made for small vesicles or tender spots, so that these can be promptly treated with carbolic.

The following are illustrative cases :—

CASE I. R. 12th October, 1920. Great pain in ear, meatus swollen and inflamed. Tenderness ant. and below swelling of glands in same positions. Drum slightly reddened, but otherwise normal. Temperature 99°.

13th October. Had no sleep previous night on account of pain, which is now very severe. Meatus more swollen, obscuring drum. Temperature 101°.

14th October. Improved. Small blisters along wall of meatus, yellowish-green in colour. (Culture made).

16th October. Improved. One blister seen. (Culture—*B. pyocyaneus*). Patient thought he was cured and did not return till the 22nd October.

22nd October. Intense pain in ear commenced previous day. Three blisters present close to the drum. (Second Culture made).

23rd October. Pain gone. One blister present. (Culture—*B. pyocyaneus*).

25th October. No symptoms. Raw spot at side of blebs.

29th October. No signs of infection. No further recurrence.

Treatment as indicated above.

CASE 2. N. 25th June, 1921. Right ear, great pain, one day's duration. Meatus swollen and inflamed. (Culture made).

29th June. Meatus still swollen and painful.

30th June. Pain less, swelling less.

1st July. Still swollen, pain less. (Second sub-culture shows the typical green colour of *B. pyocyaneus*).

2nd July. Great improvement.

4th July. Symptoms nil.

11th July. Pain both ears very acute, one day's duration, meatus in both swollen and inflamed. Yellow blebs present, yellowish-green in colour and very numerous. For the next two days the pain and swelling got steadily worse and patient got little or no sleep. Slight improvement on third and fourth days, but swelling completely blocked meatus.

Treatment. The usual routine as described above was continued for five days when patient went to Java and returned five weeks later with the following history :

Treated for one week and symptoms all disappeared, condition apparently cured. One week later relapse occurred and all the symptoms returned. Treated for two weeks, pain disappeared in both ears and right ear cleared up completely, but discharge and swelling still continued in left ear.

23rd August. Right ear normal, except for slight redness of walls of meatus and opacity of drum. Left ear, walls of meatus so swollen as to be in apposition ; pus present at entrance, seen to be oozing from a small sinus, the mouth of which is blocked by a granuloma ; acute tenderness of wall of meatus, but no pain.

Treatment. Packing with perchloride proving useless, pure carbolic treatment was started on August 26th. Under this the condition gradually cleared up and by September 5th, all symptoms had disappeared.

15th September. A small bleb appeared, showing how tenaciously the infection clings to the walls of the meatus. This was removed and the site touched with pure carbolic. After this no further trouble was experienced and the condition rapidly cleared up and did not return.

This case lasted in all eleven weeks and illustrates the difficulties met with, as well as clearly showing the efficiency of the carbolic treatment. It also shows that it is not safe to conclude that a case is cured, until all symptoms and signs have been absent for at least two weeks.

CONCLUSION

In the tropics, infections of the external auditory meatus are extremely common. I believe I have furnished sufficient evidence to show that ' True Tropical Ear ' is a clinical entity, and that *B. pyocyaneus* is the cause of the infection.

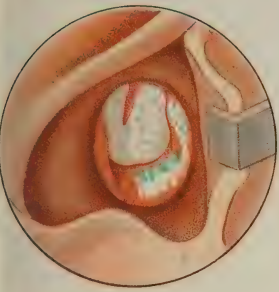
TABLE I.

DIFFERENTIAL DIAGNOSIS.

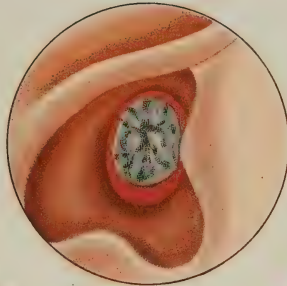
Symptoms	Otomycosis	Other Bacterial	Tropical Ear	Middle Ear disease	Furuncle
Onset.....	Gradual	Gradual	Very acute	Acute	Acute
Pain	Nil	Nil	Very severe	Severe	Very severe
Tenderness ...	Nil	Nil	Whole canal involved very severe Pinna. ant. and suf. glands	Nil	Some tenderness glands; severe the site of
Swelling	Nil	Nil	Whole canal involved; very marked. Pinna. ant. and inf. glands	Nil	In canal at site abscess and 1 ant. and inf. also
Course	Chronic with repeated recurrence	Short	Short with repeated recurrence		Short, liable to recurrence
Appearance ...	Blocked with white cheesy wax	Mild inflammation of wall and drum	Yellow vesicle or meatus may be obliterated by apposition of walls	No swelling of meatal walls	Swelling of ear clearly seen
Deafness	Depends entirely on mechanical blocking of ear	Slight	Depends on blocking of walls by swelling	Marked	Slight
Fever and Malaise	Nil	Nil	Malaise marked fever ranges between 99—101°	Malaise very marked fever to 104°	Malaise marked mild
Drum	Very rarely	Unaffected	Slight inflammation only	Bulging of drum and later perforation	Unaffected
Etiology	Fungi	Staphylococcus micrococcus Catarrh, <i>Bal. coli</i> , etc.	<i>Bacillus pyocyaneus</i>	Staphylococcus usually	Staphylococcus
Discharge	Nil	Slight serous	Greenish yellow. Small quantities in later stages, none at first	None at first, and then copious yellow pus	Thick yellow pus abscess breaks

EXPLANATION OF PLATE IV.

- Fig. 1. Early stage of *Aspergillus glaucus* infection of the ear. Fungus seen growing on the drum and on the walls of the meatus.
- Fig. 2. Early stage of *Aspergillus niger* infection of the ear. Fungus seen growing on the walls of the meatus and on the drum.
- Fig. 3. Late stage of Aspergillosis. Canal completely blocked with greyish, crinkled material, which is composed of a mass of felt-like fungus and infected wax.
- Fig. 4. *Saccharomyces* infection of ear. Walls of meatus unaffected. Drum shows large perforation and two yellow patches.
- Fig. 5. *Saccharomyces* infection of ear (later stage). Showing large horse-shoe like perforation of drum.
- Fig. 6. *B. diphtheriae* infection of ear. White membrane can be seen growing from the wall of the meatus on to the drum itself.
- Fig. 7. 'True Tropical Ear.' 1st stage, showing small, greenish-yellow vesicles on the wall of the meatus. Drum unaffected.
- Fig. 8. 'True Tropical Ear.' 2nd stage. Walls of canal red, inflamed and very swollen. Canal almost obliterated by apposition of walls.
- Fig. 9. 'True Tropical Ear.' 3rd stage, showing deep-seated abscess, which is discharging pus through a minute sinus. At the mouth of the sinus is seen a small, pouting granuloma.
- Fig. 10. 'True Tropical Ear.' Canal packed with wool through which the bright green colour of *B. pyocyaneus* shows clearly.
- Figs. 11, 12 and 13. Diagrams of Drum in different stages of *Saccharomyces* infection.
- Fig. 11. Small perforation and diseased patches devitalized by the Yeast.
- Fig. 12. Extended perforation.
- Fig. 13. Permanent perforation left after the disease.



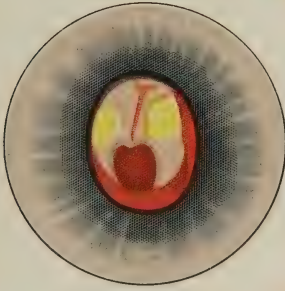
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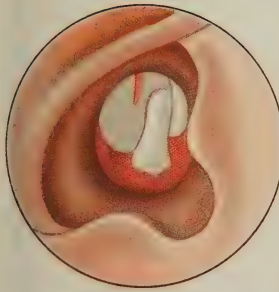
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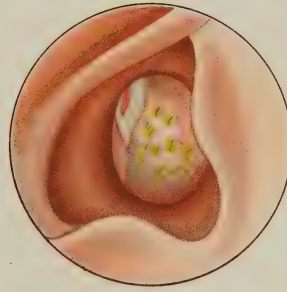
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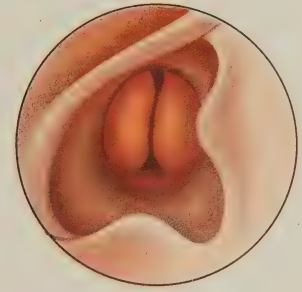
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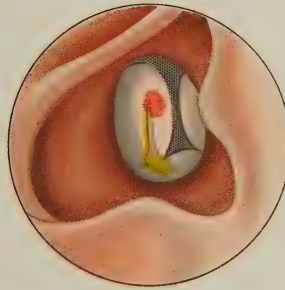
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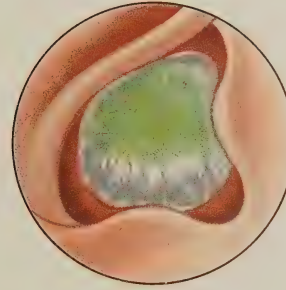
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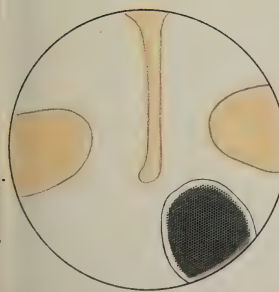
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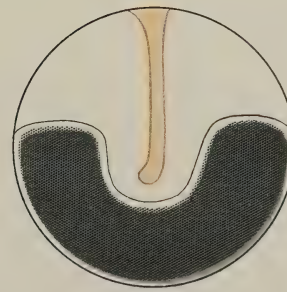
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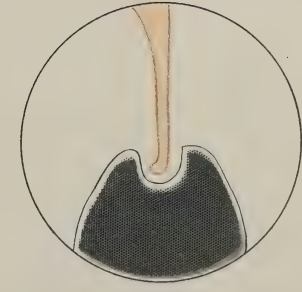
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